

EMC TEST REPORT

Report No. : EME-031284

Model No. : DVDM800

Issued Date : Dec. 5, 2003

**Applicant : E-LEAD ELECTRONICS CO., LTD.
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CHANGHUA, 509, TAIWAN**

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Project Engineer



Jackey Chiu

Reviewed By



Elton Chen

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Summary of Tests**In-Vehicle Entertainment System -Model: DVDM800
FCC ID: QYKEL707D**

Test	Reference	Results
Bandwidth of fundamental frequency	15.239(a)	Complies
Field strength of fundamental frequency	15.239(b)	Complies
Radiated emission	15.239(c), 15.209	Complies

1. General information

1.1 Identification of the EUT

Applicant	: E-LEAD ELECTRONICS CO., LTD.
Product	: In-Vehicle Entertainment System
Model No.	: DVDM800
FCC ID.	: QYKEL707D
Frequency Range	: 88.1MHz to 98MHz
Channel Number	: 100 channels
Frequency of Each Channel	: 88(MHz) + 100m (KHz), m=1~100
Type of Modulation	: FM
Power Supply	: 12Vdc with battery
Power Cord	: N/A
Sample Received	: Nov. 25, 2003
Test Date(s)	: Dec. 1, 2003 ~ Dec. 2, 2003

1.2 Additional information about the EUT

It is unlawful in most jurisdictions for a person to drive a motor vehicle which is equipped with a television viewer or screen that is located in the motor vehicle at any point forward of the back of the driver's seat, or that is visible directly or indirectly to the operator of the motor vehicle.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain	: 0dBi
Antenna Type	: PCB Printed
Connector Type	: N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Paragraph 15.239.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was supplied with 12Vdc with battery.
In Radiated Emission test, the EUT tested in the status of continuous transmitting.
The configuration of EUT was set up by the client.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	Feb. 18, 2003
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2003
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Sep. 19, 2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3133	Feb. 21, 2003
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A

Note:

Note: The above equipments are within the valid calibration period.

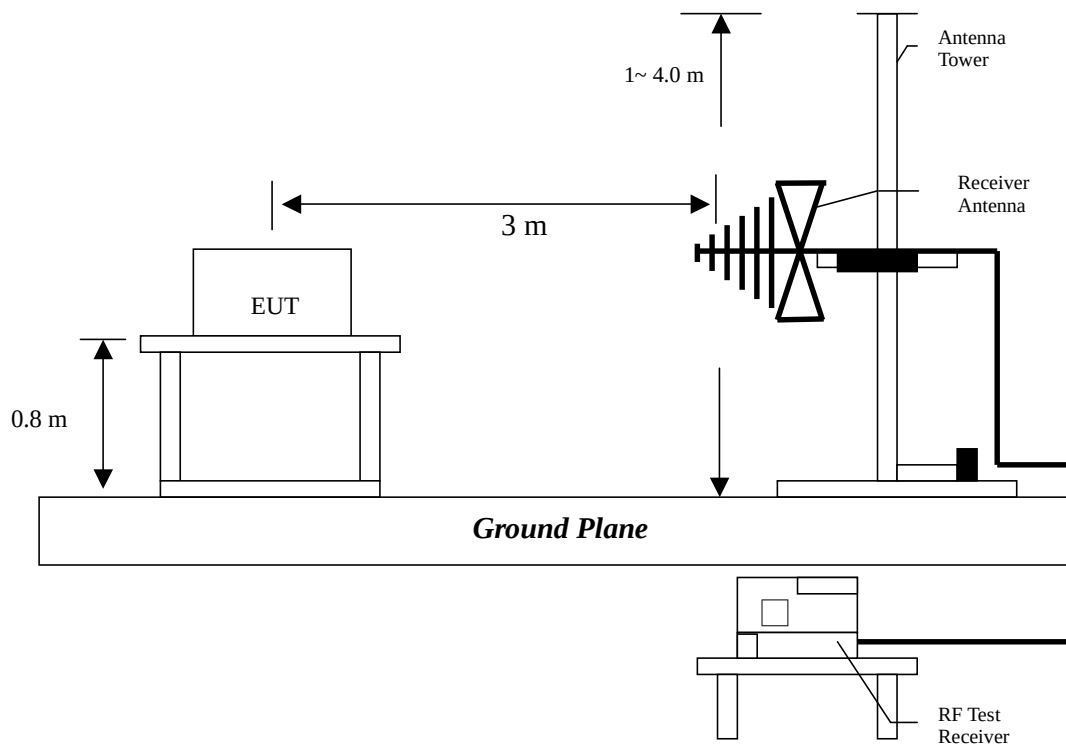
3. Radiated emission test FCC 15.239 (b)/(c)

3.1 Operating environment

Temperature:	24	°C	(10-40°C)
Relative Humidity:	54	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

3.3 Emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental	
	(uV/m@3m)	(dBuV/m@3m)
88-108	250	48

The emission limit above is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

3.3.2 General radiated emission limits

Frequency MHz	15.209 Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.98 dB.

3.4 Radiated emission test data

The radiated emissions at

Frequency(MHz)	Margin
73.70000	-1.98
172.03000	-2.81
364.50000	-1.69
363.80000	-1.39

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : DVD800

Test Condition : Tx at 88.1MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
88.10000	PK	V	9.41	18.60	28.01	68.00	-39.99	239	201
88.10000	AV	V	9.41	13.50	22.91	48.00	-25.09	239	201
73.70000	QP	V	11.62	26.40	38.02	40.00	-1.98	106	205
121.35000	QP	V	12.89	23.80	36.69	43.50	-6.81	100	154
144.02000	QP	V	14.27	17.80	32.07	43.50	-11.43	240	114
172.03000	QP	V	14.29	26.40	40.69	43.50	-2.81	102	300
364.50000	QP	V	15.81	28.50	44.31	46.00	-1.69	195	53
486.00000	QP	V	18.61	18.60	37.21	46.00	-8.79	115	39
88.10000	PK	H	9.41	20.80	30.21	68.00	-37.79	226	204
88.10000	AV	H	9.41	16.10	25.51	48.00	-22.49	226	204
122.80000	QP	H	12.89	24.40	37.29	43.50	-6.21	147	125
172.00000	QP	H	14.29	23.20	37.49	43.50	-6.01	161	120
221.19000	QP	H	11.82	26.00	37.82	46.00	-8.18	147	88
306.76000	QP	H	14.45	25.80	40.25	46.00	-5.75	104	74
363.80000	QP	H	15.81	28.80	44.61	46.00	-1.39	100	225
660.00000	QP	H	21.72	3.40	25.12	46.00	-20.88	245	304

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

The radiated emissions at

Frequency(MHz)	Margin
122.80000	-0.61
364.50000	-2.69
172.03000	-4.51
303.76000	-4.75
364.50000	-1.69

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : DVD800

Test Condition : Tx at 93.1MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
93.10000	PK	V	10.03	25.80	35.83	68.00	-32.17	162	120
93.10000	AV	V	10.03	21.80	31.83	48.00	-16.17	162	120
72.01000	QP	V	11.62	14.50	26.12	40.00	-13.88	100	97
122.80000	QP	V	12.89	30.00	42.89	43.50	-0.61	103	166
172.03000	QP	V	14.29	23.60	37.89	43.50	-5.61	100	280
243.00000	QP	V	12.85	17.50	30.35	46.00	-15.65	262	345
303.76000	QP	V	14.45	20.50	34.95	46.00	-11.05	191	316
364.50000	QP	V	15.81	27.50	43.31	46.00	-2.69	200	21
93.10000	PK	H	10.03	24.30	34.33	68.00	-33.67	234	194
93.10000	AV	H	10.03	20.10	30.13	48.00	-17.87	234	194
122.80000	QP	H	12.89	22.60	35.49	43.50	-8.01	164	123
172.03000	QP	H	14.29	24.70	38.99	43.50	-4.51	136	87
221.90000	QP	H	11.82	28.30	40.12	46.00	-5.88	100	123
243.00000	QP	H	12.85	22.50	35.35	46.00	-10.65	105	100
303.76000	QP	H	14.45	26.80	41.25	46.00	-4.75	107	119
364.50000	QP	H	15.81	28.50	44.31	46.00	-1.69	100	236

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

The radiated emissions at

Frequency(MHz)	Margin	Frequency(MHz)	Margin
122.80000	-0.21	221.10000	-4.18
144.30000	-0.03	243.00000	-4.55
172.00000	-2.01	364.50000	-1.59
122.80000	-4.81		

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : DVD800

Test Condition : Tx at 98MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
98.00000	PK	V	10.44	17.40	27.84	68.00	-40.16	140	163
98.00000	AV	V	10.44	6.30	16.74	48.00	-31.26	140	163
72.00000	QP	V	11.62	11.00	22.62	40.00	-17.38	100	212
122.80000	QP	V	12.89	30.40	43.29	43.50	-0.21	112	165
144.30000	QP	V	14.27	29.20	43.47	43.50	-0.03	100	119
172.00000	QP	V	14.29	27.20	41.49	43.50	-2.01	102	321
243.00000	QP	V	12.85	19.80	32.65	46.00	-13.35	247	304
365.00000	QP	V	15.81	21.50	37.31	46.00	-8.69	181	351
98.00000	PK	H	10.44	13.50	23.94	68.00	-44.06	128	75
98.00000	AV	H	10.44	5.50	15.94	48.00	-32.06	128	75
122.80000	QP	H	12.89	25.80	38.69	43.50	-4.81	155	139
221.10000	QP	H	11.82	30.00	41.82	46.00	-4.18	101	89
243.00000	QP	H	12.85	28.60	41.45	46.00	-4.55	104	80
303.76000	QP	H	14.45	26.20	40.65	46.00	-5.35	110	96
364.50000	QP	H	15.81	28.60	44.41	46.00	-1.59	209	129
486.00000	QP	H	18.61	14.70	33.31	46.00	-12.69	202	106

Remark:

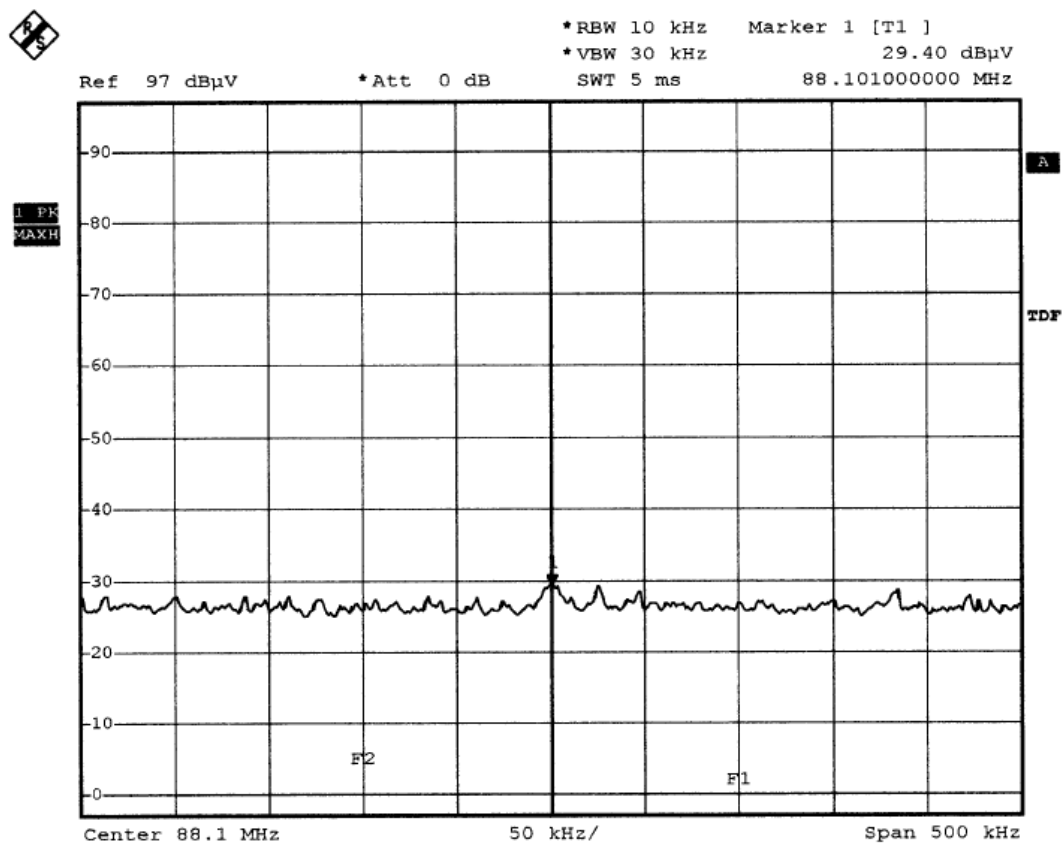
1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

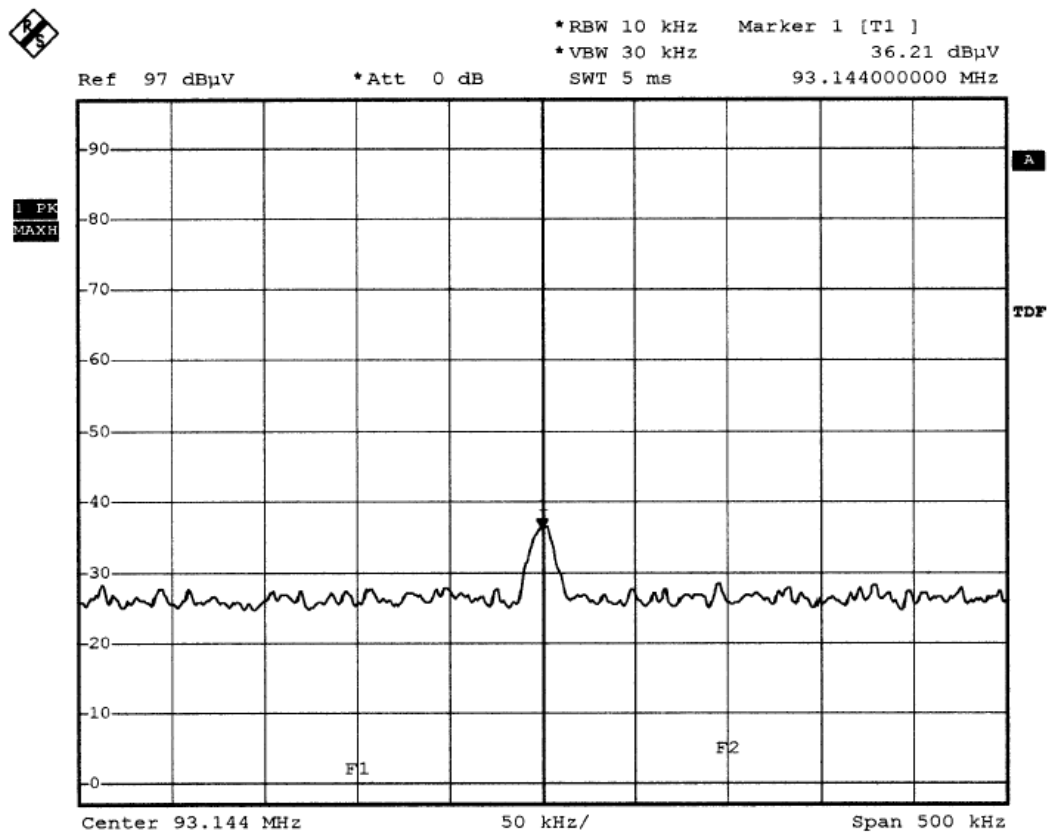
4. Bandwidth of fundamental frequency FCC 15.239(a)

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operation frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

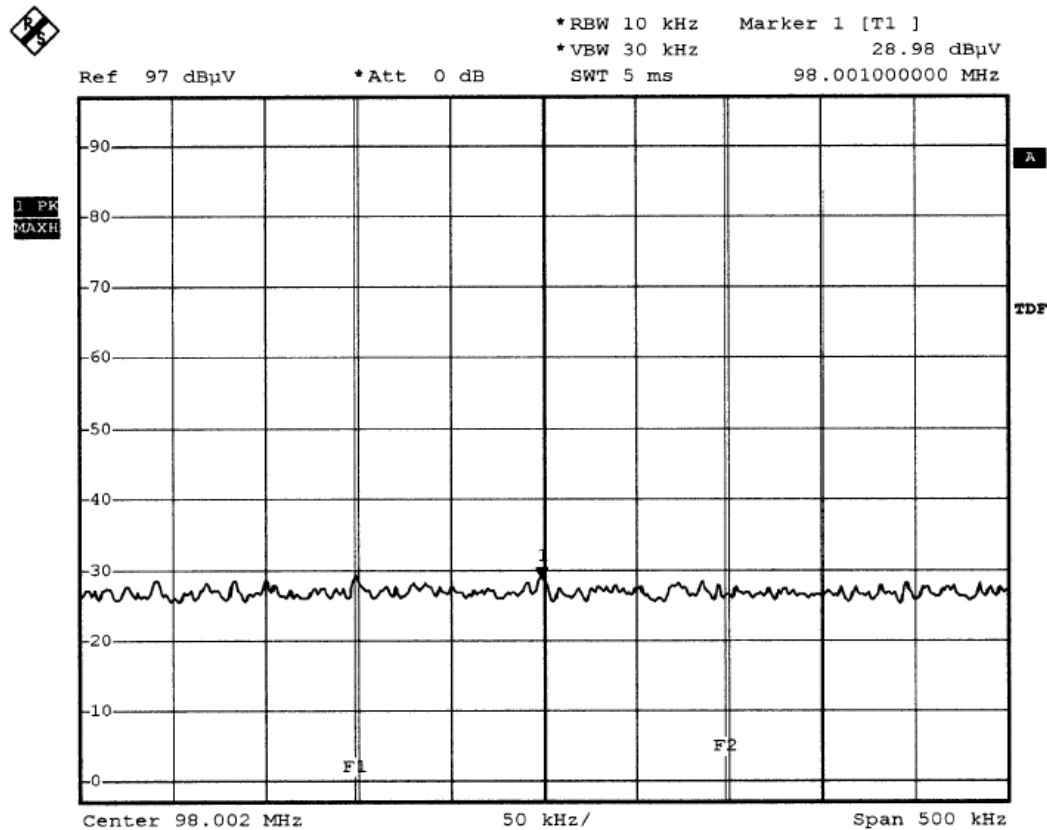
Please see the plot below.



Comment A: fundamental at Rated spurious at 88.1MHz
 Horizontal polarization (EC338/353/360)



Comment A: fundamental at Rated spurious at 93.1MHz
Vertical polarization (EC338/353/360)



Comment A: fundamental at Rated spurious at 98MHz {
Vertical polarization (EC338/353/360)